

# THE SCIENCE NEWS-LETTER

*A Weekly Summary of Current Science*

EDITED BY WATSON DAVIS

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EDWIN E. SLOSSON, Director  
WATSON DAVIS, Managing Editor



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## HOW TO LOSE WEIGHT

By Dr. Edwin E. Slosson

I have learned how to lose weight without dieting, exercising, drugging, or massaging. I have long been interested in this question, not only from scientific curiosity but for personal reasons which it is not necessary to mention. Knowing that many others are interested for the same unspecified reasons, I hasten to give the information freely to the world.

I have not tried the process yet but I will not wait for that. If people with a new panacea for bodily or political ills delayed recommending it to others till they had tried it out the world would lose much literature. Besides I get the information from the weightiest authority on weight in the country, namely, the U. S. Coast and Geodetic Survey, which makes gravity determinations at over 300 stations with the utmost accuracy. The Survey does not apply the results of its investigations to the personal problem. The credit for this is wholly mine. But from the Survey figures I extract the following secret:

The way to lose weight is to travel.

But it all depends upon the way you travel.

You must go from high latitudes to low latitudes or from low land to high land, or better, do both.

For instance, if you weigh two hundred pounds - I don't mean to insinuate that you do, but some people do, and it makes the figuring easier to start with - if you weigh two hundred pounds at the North Pole - of course you don't but call it so for convenience - and you journey to the mouth of the Amazon, you would weigh only about 199 pounds there, and this is not considering possible losses on the voyage. This may not seem to everybody a considerable reduction but if you weigh two hundred pounds you will know that it is well worth working for. Every merchant knows that marking down an article from \$2.00 to \$1.99 makes it much more attractive to bargain hunters.

If you travel from the North Pole to the top of Mount Chimborazo, Ecuador, which is near the equator and four miles high, you would reduce your weight from 200 pounds to 198.6. Of course, in order to gain this loss you would have to be weighed by spring balances and in a vacuum, for if beam balances were used the weight of the weights would fall off in the same proportion as you did and if you were weighed in air its buoyancy at low levels would tend to counteract the effect.

Or, if you are not interested in your personal avoirdupois you would make money by buying gold on Mount Chimborazo and selling it at the North Pole. A nugget of gold weighing 200 ounces Troy on the mountain would increase in weight by about 1.4 ounces on being transported to the Pole and would be worth about \$28 more. But perhaps it would be more profitable to travel about Europe and take advantage of the exchanges.

The reason for such variations of weight is due to the fact that a rotating body develops a centrifugal force that tends to throw off any loose object on its rim. We have all been struck by this while standing near an automobile speeding by in the mud.

Since the earth is a rotating body it, too, develops a centrifugal force which would be sufficient not only to throw off all unattached objects on the surface but to tear the earth to pieces, like a giant defective fly-wheel, if it were not overbalanced by the centripetal pull of gravitation.

The pull of gravity, as we ordinarily understand it, is a combination of two pulls or forces, the gravitative force of the earth and its centrifugal force. Both of these forces vary for different places on the earth. The centrifugal force varies from a maximum at the equator to zero at the poles, due to the fact that the linear speed of rotation is greatest at the equator and nothing at the poles. The other force, gravitation, depends upon the distance to the center of the earth and is, therefore, greatest at the poles, since the distance to the center is there 13 miles shorter than from a point on the equator. For the same reason gravitation is less at sea level than at the top of a high mountain peak in the same latitude.

There are other causes for the variation of gravity on the surface of the earth. For instance, gravity is less on a plateau than at the top of a sharp mountain peak of the same elevation, and is less above rock of low density than above heavy rock. It is possible that the discovery of material of abnormal density by gravity observations may have some bearing on the search for mineral or oil deposits hidden deep in the earth.

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#### NO HOPE FOR FAT MICE; THEY'RE BORN THAT WAY

If the tendency toward adiposity in humans follows the same laws that it does in mice, there is no hope for fat folks; they'll be obese no matter how hard they try to reduce. That is the cheerless moral that may be drawn from the researches on fatness in mice, reported to the American Association of Anatomists at their recent meeting in Cleveland, by Dr. C. H. Danforth of Leland Stanford University.

Studying abnormalities hitherto somewhat loosely classed as "constitutional" Dr. Danforth has shown that some of them, including a tendency to extra weight, are in his animals definitely due to hereditary factors. There seems to be a connection between fatness and yellowish hair, so far as mice are concerned, for the four-footed little blondes (Dr. Danforth's mice were females, by the way) all tended to

toward the "billy" type, averaging from thirty to one hundred per cent. heavier than ordinary mice kept under the same conditions. This held true whether the mice were kept on a strict diet or whether they were highly fed.

Other "constitutional" tendencies, such as the production of extra legs, were also shown to be due to definite hereditary factors.

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#### SUN WILL LAST FOR BILLIONS OF YEARS

Giving off heat at the rate that it is doing at present, the sun will last about 15,000,000,000,000 years, according to the calculations of Prof. W. D. MacMillan, of the University of Chicago. According to the latest theories, said Prof. MacMillan, and of which he is one of the originators, the heat of a star such as the sun is supplied by the actual transmutation of matter into energy. The sun's present mass, he says, will in this way supply the solar system with heat and light for the period stated.

However, lest there be any fear for the fate of our descendants after that time, Prof. MacMillan stated that the sun may well be able to gather up more matter as it passes among the stars to replace that lost by radiation. So-called "empty" space, is really full of much matter besides that which we see shining in the sky, and Prof. MacMillan estimates that if such matter is distributed in as extremely rarefied a state as a cubic foot of normal atmospheric air expanded to fill a cube 30 miles on a side, it would be sufficiently dense to maintain the solar mass. This density is not improbable, he thinks.

As for the question of whether or not there may be life elsewhere in the universe, he thinks that it is quite likely.

"Life is not a phenomenon peculiar to the earth," he said. "It exists upon the earth because the conditions upon the earth have been favorable for a sufficiently long period of time. In the past million years or so, it has developed a certain small degree of intelligence, and the race of man is beginning to pry into the secrets of nature with a real curiosity. Elsewhere in an infinite universe there are other suitable abodes, infinitely many, with races of living beings upon them. Some of these races are young, some of them are vastly older than ours, more highly developed, much wiser. Such races existed before the earth was formed or even before the sun started on its career as a star; after the earth and even after the sun has passed out of existence, other races of living beings elsewhere will be repeating with infinite variations the experiences which we are having upon the earth at the present time.

"Atoms, living beings, stars and galaxies are permanent forms in the universe. It is the individuals only that come and go."

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Dogwood owes its name to its similarity of sound and writing to dagwood, a shortened form of daggerwood; so called because it was formerly used to make daggers or sticks to hold together meat roasted over an open fire.

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### PREDICTS CHILD'S SEX LONG BEFORE BIRTH

A chemical method which, according to the claims of its discoverer, Prof. Hugo Sellheim of Halle, will enable anxious prospective parents to know far in advance whether the expected child will be a girl or a boy, has been tested in the obstetrical clinic of the University of Halle, Halle, Germany.

Prof. Sellheim's method is a modification of a test devised some years ago by the famous chemist, Prof. Emil Abderhalden, to determine in its early stages whether or not pregnancy really existed. Prof. Abderhalden's test depended on certain chemical interactions between the blood of the mother and of her unborn child. It could be performed, however, only after a tedious process of dialysing, or filtering, the blood serum through a special type of membrane, and so has not been used to any extent.

Prof. Sellheim states that he has discovered a way to eliminate this long filtering process. He mixes the serum with alcohol, subjects it to treatment with heat, and then passes it through a much more rapid type of filter. The test is much more delicate as well as more easily made, he says, so that in addition to indicating whether or not a child is to be expected, it is possible to predict its sex.

The amino acids of the blood serum are said to give different color reactions when tested after fermentation with a small piece of the placenta of another woman. Physical tests, such as the determination of the electrical conductivity of the fluid, are also held to be possible.

This surprising announcement has naturally aroused considerable discussion in Germany as to its possible effects on social problems of the present. Authorities express the fear that, if it proves true, it may have a bad influence on the birthrate.

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### BLUE MEANS DANGER IN MENTAL TROUBLE

Mental blues, like the red flag on the railroad tract, may be a warning signal of danger ahead, according to a statement made by the National Committee for Mental Hygiene. The committee hastens to explain that it does not refer to the ordinary Monday morning blues, nor to any of the transient spells of gloom that attack almost every one at some time or another. The warning blues are "a deep and prolonged depression, all out of proportion to the ascribed causes."

A study of 167 cases of suicide in Massachusetts showed that almost one-third were the result of mental disease, and depression was an outstanding symptom in the cases.

"The majority of such suicides are preventable," the committee finds. "Relatives, friends, and business associates usually notice the mounting despondency in time to take action. Well-meant advice to 'cheer up' or to travel for a change fails of its purpose in such cases. Where a depression is the symptom of mental disease - and that is often - the sufferer is quite immune to ordinary logic or argument. He lives in a gloomy, pathologic realm of his own, where values and perspectives are morbidly distorted. Diagnosis by a competent psychiatrist and understanding hospital care are the only means by which such a person can be helped and safeguarded."

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Coast Guard cutters engaged in the international ice patrol have set out for the Grand Banks region where they will attempt to locate the distance of icebergs from a ship by means of the sonic depth recorder. The work is new and requires exceptionally fine mechanism. If successful it will very nearly eliminate danger from icebergs to ships carrying the device.

According to the method to be used, the sound wave will first hit the bottom of the ocean and then reflect against the iceberg, after which it will be reflected back to the ship.

The cutters will also attempt to relocate the course of the Labrador current, which last spring was found to have disappeared under the Gulf Stream.

Other work with the depth recorder will include a new depth map of the region around the Grand Banks. The depths hitherto have been obtained by soundings and in many instances have been found inaccurate.

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#### FERTILITY VITAMIN IN LEAVES AND SEEDS

Vitamin X, the newly discovered vitamin whose presence in foods is necessary for the production of offspring, has been shown to be present in a large variety of vegetable and animal substances by Drs. Herbert M. Evans and George O. Burr of the University of California, who told of their results before the meeting of the American Association of Anatomists, recently held at Cleveland.

They have found it to be present in small concentrations in many kinds of animal tissue, when the animals had been fed on vegetable foods containing it, but not in parts of animals fed upon a ration lacking in vitamin X. It is present also in milk fat and egg yolk. Cod liver oil, an important source of the vitamin that prevents rickets, is almost totally lacking in the fertility vitamin.

In vegetable tissues, the investigators state, vitamin X is low or absent in potato tubers, but abundant in leaves and is not injured by careful drying of such leaves as lettuce, alfalfa, pea, and tea. It is present in some fruits, the banana for instance, and particularly abundant in seeds, such as those of wheat, corn, oats, cotton, lettuce and alfalfa.

"Since X is fat soluble, we have studied vegetable oils," the investigators state. "Most of them contain the vitamin, but few in high concentration; crude cottonseed oil, corn, olive, coconut, walnut, peanut and flaxseed oils can all be fed daily in quantities five times the required minimum of wheat germ oil without restoring fertility. Yet butter, walnut oil and a certain lard substitute have been proven to do this immediately when fed at high levels.

"The vitamin is thus seen to have a wide distribution if we disregard percentage abundance. In no other instances have we been able to encounter it in as concentrated form as in the ether extract of wheat embryo flakes, and dessicated leaves of lettuce."

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## DOUBLE GLAND ACTION PREVENTS CRETINISM

Cretinism, a distressing disease marked by idiocy and failure to grow normally, has been shown to result from the failure of two internal glands to function properly by the studies of Drs. Charles F. Flower and Herbert M. Evans of the University of California, who reported their results before the meeting of the American Association of Anatomists.

The two glands concerned are the thyroid, located in the throat, and the pituitary gland, or hypophysis, situated just beneath the brain. The pituitary itself is a triple gland, and only its forward portion seems to be concerned in the phenomena studied by Drs. Flower and Evans.

They removed the thyroid glands from young rats, and treated some of the animals thus operated upon with daily doses of extract from the anterior part of the pituitary. These grew normally, while rats that did not receive the extract definitely developed cretinism. The investigators therefore conclude that the prevention of this disease, whether in animals or human beings, depends primarily on the normal functioning of the pituitary gland, that the thyroid in some way is necessary for the proper working of the pituitary, and that where cretinism follows a diseased condition of the thyroid it is due really to the failure of the pituitary, which has not received the necessary stimulus from the larger gland.

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BRAINS MAY BE HANDICAP IN ROUTINE JOBS

Once again the slow, plodding tortoise type wins over the swift, uncertain hare. In other words, girls of active intelligence are not so desirable for some kinds of monotonous jobs as sluggish, slow minded workers.

In a study of 375 adolescent girls placed in industrial positions, Dr. Emily T. Burr, of the Vocational Adjustment Bureau, has found that "intelligence may be a detriment to steady, efficient work". Bright girls find uninteresting tasks irksome and they become restless and find other employment, thus adding to the large turnover of labor. On the other hand, girls who are assigned to work that is too difficult for them are soon dismissed because of "spoiled goods", "slowness", or "inability to learn job".

Girls whose mental age is seven years and six months make satisfactory packers of small articles not easily damaged, such as placing powder puffs in small oiled envelopes, Dr. Burr finds. But the packing of fragile hair nets, each of which has to be carefully picked out of a large quantity and folded, demands a mentality of at least nine years and nine months.

The simplest sewing machine jobs, such as window shades, are readily handled by girls whose mental age is twelve years. But straight seam sewing and the sewing on of braids and bindings requires an intellectual level of thirteen years.

Finding the minimum intelligence levels required in various industrial tasks is expected to reduce to some extent the number of girls placed in positions which they are not able to fill satisfactorily.

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## THIRD COMET OF FORTNIGHT VISIBLE WITH FIELD GLASSES

The third comet to be discovered in two weeks was found on April 4 by Prof. L. Orkisz, of the University of Cracow in Poland. This announcement was made by Prof. Harlow Shapley, of the Harvard College Observatory, upon the receipt of cable dispatches from Prof. Elis Strongren of the University of Copenhagen in Denmark. The new visitor was observed on Sunday, April 5, by Dr. Johannes Moeller, at the School of Navigation at Oldenburg, Germany, who reported that it was in the constellation of Pegasus, which rises in the east at present about two hours before the sun. It is of the eighth magnitude, visible in a small telescope. Its position is about eight degrees west of the star alpha Pegasi, the southwestern member of the group of four stars forming the "Great Square in Pegasus", and it is moving directly northwards with a speed of one degree a day.

Shajn's comet was the first to be discovered during the two week period being picked up by G. Shajn of the Pulkovo Observatory, Russia. The second was discovered by William Reid, an amateur astronomer near Capetown, South Africa, on March 24. It was in the constellation of Virgo. Both of these comets have been seen with the 26-inch telescope of the U. S. Naval Observatory at Washington, and from other American observatories, but are still too faint to be seen with the unaided eye.

## ECLIPSE MODEL DUPLICATES NATURE

Visitors at the building of the National Academy of Science in Washington who missed the total eclipse of the sun last January, are now able to see the effect in a realistic model which has just been installed after the design of Dr. R. W. Wood, professor of experimental physics at Johns Hopkins University. This model shows the eclipsed sun, with the corona shining forth from behind the moon, against a deep blue and slightly clouded sky as a background, and is said by persons who have seen total eclipses to give an accurate idea of the appearance of this rare phenomenon.

The apparatus, which Dr. Wood originally devised to test eclipse cameras, consists of a flat glass jar, filled with a solution of methylene blue, a coal tar dye, to which has been added a small amount of gum, to give a slight cloudiness. Into this is immersed a small electric bulb, in front of which is an opaque metal disc to keep the direct light from reaching the observer. Parts of the bulb are shaded, and when it is turned on, the tiny particles of gum in the solution around it reflect light in such a way that luminous streamers seem to project from behind the black disc representing the moon.

Not only does it resemble the corona of an actual eclipse in appearance but it has been found that the light is polarized, or vibrating in a single plane, unlike ordinary sun or electric light, which vibrates in every possible direction. This polarization is one of the characteristics of the actual corona of the sun, and has led to the theory that it, too, is largely light reflected from small particles.

There are no true wolves in Africa, although large jackals in Abyssinia and the Sudan are sometimes known as wolves.

## APE-MAN NO HIGHBROW, BUT LONG-HEADED

The proud Nordic race has to move over and make room for another "dolichoceph", or long-skulled individual, and that the humblest relation on the family tree, poor old Pithecanthropus erectus, the ape-man of Java. Prof. Hans Weinert, of Berlin-Potsdam, who has compared his own data with the measurements of this famous skull recently published by its discoverer, the Dutch physician Eugene Dubois, states that the revised data place this most ancient of man-like creatures in the long-headed class, popularly supposed to comprise only the aristocracy of races.

Although the skull-top, thighbone and bit of jaw, the only relics so far discovered of Pithecanthropus, were found over thirty years ago, Dr. Dubois has until within the last few days given out only preliminary results of his studies, and has permitted very few scientists to see his specimens. Dr. Weinert, however, has been one of the few privileged to study them and has made careful measurements. The new figures show that the width of the skull is less than three-fourths of its length, which places it in the "long" classification.

Dr. Weinert also reviews the controversy as to whether Pithecanthropus was really a man or simply a large ape. He inclines to the opinion that the creature was truly human, though on a low level. The three loose teeth that have been found, and the roots of the teeth in the jaw fragment, are all of a human rather than an ape type, though rather large for a man.

More important, however, is the size of the brain. The portion of the skull in Dr. Dubois' hands has a capacity of 570 cubic centimeters. This is estimated to be about two-thirds of the capacity of the original brain cavity, which would thus be approximately 855 cubic centimeters. This is nearly double the size of the gorilla's brain, which is 500 cubic centimeters, but nowhere near the size of a modern man's, which runs between 1200 and 1600. Only the smallest brains among pygmy races are as small as 900 cubic centimeters, and Pithecanthropus, though not so tall as a modern man, was no pygmy. Sir Arthur Keith, the British anthropologist, sets 1000 cubic centimeters as the lowermost brain size that can be called human. With an estimated 900 and a little scientific charity, Pithecanthropus just makes the grade.

And still he is a long-head.

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CELLULOID HIPPOPOTAMUS NEW MUSEUM BEAST

A celluloid hippopotamus is the latest thing in museum art.

Heretofore the hippo has defied the skill of taxidermists, not because of its mountain-like bulk or any intricate anatomy, but because its skin could not be reproduced with convincing realism. But L. L. Walters, of the Chicago Field Museum of Natural History has been working for a number of years to perfect methods for making lifelike reproductions of smooth-skinned and scaly animals, especially reptiles and amphibians, and he is now constructing a large hippopotamus which is said to be a triumph of realism.

He has found that when celluloid is used as a coloring medium it is possible to produce translucent effects and varying degrees of shade so as to give almost the semblance of living flesh and blood. The method involves replacing the skin of an animal by a colored celluloid compound so that the real hairs are left imbedded in the celluloid.



The day of the crudely stuffed museum exhibit is over. The modern taxidermist models the form of an animal just as a sculptor models a bronze statue, and over this form he fits the carefully prepared skin. Use of celluloid is regarded as a step toward final perfection of detail. The method is found especially useful in reproducing the hairless faces of certain monkeys and the nose pads and lips of many animals.

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#### MANY CANCER VICTIMS HAD GOITER, DOCTOR FINDS

After studying data from several countries, Dr. Percy Stocks of the University of London has found a connection between the prevalence of goiter and the rate of mortality from cancer of the stomach and esophagus.

Dr. Stocks says that his findings "seem to indicate that defective functioning of the thyroid gland is favorable to the incidence of cancer of the stomach, and possibly of other organs also."

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#### NEW TABLES COMPILED FOR MEASURING TIMBER

New methods of measuring the volume of lumber in a given stand of trees will be proposed by the U. S. Forest Service in connection with American Forest Week, April 27 to May 3. Existing tables used by forestry officials and lumber companies, it is pointed out, are based on measurements made on trees cut from old growth, and it is not certain that they apply to conditions obtaining in second-growth timber and reforested areas.

The proposed new tables are based partly on recent studies in Europe, which have shown that the amount of taper in the trunk of a tree is uniform in all species, at least among conifers. This is important, inasmuch as it obviates the need for changing this factor for each kind of tree. Other factors vary, however, especially thickness of bark, and amount of butt swell, and these must be taken into consideration in estimating volume in different types of forest.

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#### FERTILIZER IN PONDS INCREASES FISH YIELDS

Treating fish ponds as pastures, by fertilizing them, increases the yield of the finny "cattle", according to experiments recently concluded by Dr. H. Fischer, lecturer at the University of Munich. Dr. Fischer obtained his best results with basic phosphate slag and other phosphate fertilizers; potash salts and other types of fertilizer had effects less pronounced or only temporary.

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An entomologist was recently sent to Central Europe by the U. S. Government to act as nurse and groom for certain insects which are being brought to this country to fight the gypsy moth.

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## STUDIES FORMATION OF ACID IN STOMACH

An answer to the riddle of where the stomach makes its hydrochloric acid was presented before the meeting of the American Association of Anatomists by Drs. Alden B. Dawson of the Loyola University School of Medicine and A. C. Ivy, of the University of Chicago. By microchemical tests on the linings of stomachs of dogs made during the period of secretion, they learned that the acid, which is a necessary part of the digestive juices, is formed in the cells of glandular structures lining the stomach walls.

To perform the experiments, a preliminary operation was necessary which virtually gave the dog a double stomach, in one of which the usual digestive processes went on. The second, known as the Pawlow pouch, was isolated from the digestive tract and connected with the outside of the body by an opening, which permitted the observations to be made without inconvenience or pain to the animal.

## GAS MASK NOT MAGIC ARMOR SAYS BUREAU OF MINES

The ostrich that trustingly sticks its head into the ground and thinks itself well protected is now matched by the human being who puts on a gas mask suitable for certain gases and walks into an atmosphere reeking with entirely different poison vapors. The U. S. Bureau of Mines reports that workers who have put misplaced confidence in gas masks have been overcome by the carbon monoxide or other toxic gas present, and in cases not promptly treated death is the result.

The Bureau has succeeded in developing a universal gas mask which is effective against all poisonous gases released in the air, provided these are not present in large proportions. But even this protection is no magic device to meet all emergencies. The universal mask will not supply oxygen, and when oxygen in the air is reduced below the safe breathing limit of 12 or 15 per cent. oxygen helmets which feed the worker with oxygen through the mask must be employed.

## FLORIDA TORNADO CAME FROM CALIFORNIA

The traditional jealousy between California and Florida evidently has even affected the weather for the storm resulting in the tornado which passed near Miami and resulted in the loss of several lives and the destruction of a million dollars worth of property on April 5 was a California product, according to C. L. Mitchell, forecaster of the U. S. Weather Bureau, Washington, D.C.

"This storm presented several unusual features," said Mr. Mitchell. "On March 30 it entered the United States from the Pacific Ocean about a hundred miles north of San Francisco, and swept east southeast, but instead of veering northeast after passing the Rocky Mountains, as is usual with such storms, it continued in a straight line and at 8 A.M. on April 4 it covered northern Mississippi. Still in the same path, it reached Florida on April 5. Up to this time it had been relatively mild, and had not done any damage, but when near Miami, it developed into the tornado which produced the destruction."

That southern Florida is well off the usual track of tornadoes is indicated by the records for the last eight years, in which 752 occurred of which only six were in Florida. Most of these were in the northern part of the state, and they resulted in the loss of only one life.

CORRECTION: - Through a clerical error, News-Letter No. 210 was dated April 25 instead of April 18.